PTO 06-5187

Japan Kokai

04-133973

PAIL PACK FOR HOUSING WELDING WIRE

(Yosetsu yo Waiya Shuno Peiru Pakku)

Noburo SAEKI

UNITED STATES PATENT AND TRADEMARK OFFICE

Washington, D. C. June 2006

Translated by: Schreiber Translations, Inc.

Country	:	Japan
Document No.	:	04-133973
Document Type	:	Kokai
Language	:	Japanese
Inventor(s)	:	Noburo SAEKI
Applicant	:	Nippon Steel Welding Production & Engineering Co., Ltd.
IPC	:	B 65 H 59/06
Date of Filing	:	September 21, 1990
Publication Date	:	May 7, 1992
Foreign Language Title	:	Yosetsu yo Waiya Shuno Peiru Pakku
English Title	:	PAIL PACK FOR HOUSING WELDING WIRE

SPECIFICATION

I. Title of the Invention

PAIL PACK FOR HOUSING WELDING WIRE

II. Claims

1. A pail pack for housing welding wire, which is a pail pack for housing welding wire mounted with a presser member on a loop lamination body of a welding wire housed in the pail pack and

is characterized by the fact that said presser member is provided with magnet members for magnetically attracting wire loops and is provided with a wire withdrawing hole having a diameter equal to or larger than the inner diameter of the loop lamination body.

2. A pail pack for housing welding wire, which is a pail pack for housing welding wire mounted with a presser member on a loop lamination body of a welding wire housed in the pail pack and

is characterized by the fact that said presser member is

provided with magnet members for magnetically attracting wire loops,

[1]Numbers in the margin indicate pagination in the foreign text.

provided with a wire withdrawing hole having a diameter equal to or larger than the inner diameter of the loop lamination body and is further provided with a control member protruding above a cavity part of the loop lamination body in the form of eaves.

III. Detailed Description of the invention

This invention relates to a pail pack housing a welding wire for withdrawing the welding wire from the pail pack, in which the welding wire is laminated and housed in the shape of loops, smoothly and continuously in a non-tangled state.

[Prior Art]

A pail pack (cylindrical container) is used as a container for housing a large capacity of welding wire, the withdrawal of wire from the pail pack is carried out by withdrawing the upper end of a lamination body of wire loops to the upper part outside the pail pack and guiding it to a welding torch via a :]<⊥/Δ tube by a wire feeding machine.

The welding wire housed in this pail pack is twisted within a range of elastic limit, for example, it is housed by giving a twist of 270° ~ 360° per one loop of wire (e.g., Japan Utility Model 57-126472). Therefore, a force twisting the wire in the pail pack is inherent, if the wire is freed, it has a tendency to jump to the axis direction of pail pack, twines during the /2

wire withdrawal and tangling markedly appears. Therefore, methods wherein an annular presser member is mounted at the upper end of a lamination body of wire loops in a pail pack to eliminate the jump-up of wire by suppressing the wire from the above by its self-weight have been proposed before (Japan Tokkyo 59-8474, Japan Utility Model 63—20679). In the method disclosed in Japan Tokkyo 59-8474, as shown in Fig. 6, a wire withdrawal hole **3a** formed in a presser member **3** is nearly in conformity to the axis of a cylindrical or a pipe-like cavity **7** formed at the center of a pail container **1** and formed in a diameter smaller than the outer diameter of said cylindrical or pipe-like cavity **7**, and a wire is withdrawn along the inner surface of said drawing hole hole **3a**.

On the other hand, the purport of a housing pack disclosed in Japan Utility Model 63-20679 consists in forming it in such a way that when a wire is drawn from a side where it is not in touch with the inner surface of a pack container, i. e., the inner side, the housing pack has a shape of scooping out the inner side of said presser member to a truncated cone, i. e., it has a an essential thickness in the height direction, i. e., a hollow part for wire withdrawal in said thickness direction and the inner diameter of said hollow part is small in the upper part and large in the lower part by viewing from the height direction so that a detachment position from the upside of

lamination is approached to the inner side of container as far as possible and the wire is detached from a presser member at a position separated from the upside of lamination. More specifically, as shown in Fig. 7, two rings (small-diameter side: 5A and large-diameter side: 5B) are slightly separated up and down and arranged concentrically, connected by connecting members **6** and friction members **4** are mounted to the connecting members **6**. Then, (a) is an oblique view, and (b) is a cross-section explanatory view along a chain line B-B.

[Problem to Be Solved by the Invention]

However, there were such problems in the conventional pail packs. As is evident from the announced gazette, the housing pack disclosed in Japan Utility Model 63-20679 is a modified technique of the above Japan Tokkyo 59-8474. Namely, in the method disclosed in Japan Tokkyo 59-8474, as shown in Fig. 6, a wire is drawn out through a drawing hole **3a** formed at the center of a presser member **3** as shown by **2a**, but the presser member **3** is in touch with the utmost surface of lamination to fulfill its function, therefore a strong friction with a lower corner **3b** in the drawing hole **3a** cannot be avoided because the drawing wire **2a** passes through the drawing hole **3a** and converts its direction upward, and a sudden bending force is also subjected in this part, therefore abrasion easily occurs at the surface of wire, a bending tendency occurs, the wire bends and the bending remains,

all of them become obstacles to smooth delivery of wire and sometimes also exert adverse effects on the welding arc itself. In addition, an important problem consists in that when a rotary moment in a direction of arrow A to the drawing wire **2a'** generates, a rotary moment in a direction of arrow B generates in a drawing wire **2a'** just below the presser member **3** with the lower corner **3b** as fulcrum, the wire **2a'** tangles and twines under the lamination wire, thereby the drawing resistance of wire suddenly increases and finally the wire falls into undrawable situation. On the other hand, in the Japan Utility model 63-20679 for sol-ving this problem, Fig. 7(C) is a cross-section explanatory view showing a user mode of the presser member shown in (a). As compared with Fig. 6, it is clearly different in that a lower corner **5A'** of inner surface of a small-diameter ring **5A**, which is a contact passage point of drawing wires **2a**, **2a'**, rises to a position higher than the lower corner **3b** in the presser member **3** of Fig. 6, and a directional conversion to a direction in which the drawing wire **2a'** passes through there proceeds. Accordingly, the above-mentioned rotary moments A, B with the lower corner **5A'** being a contact passage point as fulcrum relatively reduces, and the drawing wire **2a'** does not tangle into the lamination wire. The rising angles of drawing wires **2a**, **2a'** become gentle as a whole, the wire drawing resistance is reduced and the degree of bending of wire at the

lower corner **5A'** also dec-reases, therefore no abrasion or bending are given to the wires, and the stability of welding is further improved.

However, the housing pack of this Japan Utility Model 63-20679 has the following problem.

Like Fig. 7(c), the presser member arranged on the upside of laminated and housed wire **2** acts on only a part of wire loops (only the wire just below the large-diameter ring **5B**) and no /3 any applied pressure due to the presser member exists in the majo-rity of wire loops, therefore a spring pack is easily generated. It is pulled out to the drawn wires **2a**, **2a'** and Successive 2 ~ 3 loops are also dragged by the drawn-out wires **2a**, **2a'** and easily drawn out at the same time. The wire may be withdrawn one loop by one loop from the upper part of the lamination body of loops, but if 2 ~ 3 loops are withdrawn at the same time, the wire jumps to release the twist in the cavity part of the pail pack, thereby inconveniences such as twining, tangling, etc. occur. Thus, if the tangling, twining, etc. occur in the wire inside the pail pack during the welding, the wire is not delivered to a welding torch, the welding operation cannot be continued, or even it can be continued, the occurrence of welding defects cannot not avoided.

When a pail pack is used for simultaneous withdrawal of 2 ~ 3 loops to the cavity part in the pail pack, especially for

simultaneous withdrawal during exchange of pail packs, the defects markedly appear. Namely, this pail pack is so arranged that the wire end part of the welding wire comes from the wire withdrawal hole to the upper part via the downside of presser member, therefore it presents a state that the presser member is lifted by the wire of lower end part, consequently the suppressing effect reduces. As described above, the presser member partially suppresses the wire loops, the suppressing effect of the presser member gradually reduces and troubles during the wire withdrawal become easy to occur.

Accordingly, this invention is to provide a pail pack for housing welding wire that can smoothly withdraw a wire without tangling, twining, etc. during the withdrawal of wire from the pail pack.

[Means for Solving the Problem]

The pail pack for housing welding wire of the first invention is a pail pack for housing welding wire mounted with a presser member on a loop lamination body of a welding wire housed in the pail pack and is characterized by the fact that said presser member is provided with magnet members for magnetically attracting a wire loop and is provided with a wire withdrawing hole having a diameter equal to or larger than the inner diameter of the loop lamination body.

A pail pack for housing welding wire of the second invention is a pail pack for housing welding wire mounted with a presser member on a loop lamination body of a welding wire housed in the pail pack and is characterized by the fact that said presser member is provided with a magnet member for magnetically attracting a wire loop, provided with a wire withdrawing hole having a diameter equal to or larger than the inner dia-meter of the loop lamination body and is further provided with a control member protruding above a cavity part of the loop lamination body in the form of eaves.

[Functions]

The presser member of the pail pack for housing welding wire of this invention is provided with ferromagnetic magnet members attracting the wire loops, therefore it is dragged by the pulled-up wire loops, even if successive 2 ~ 3 loops are irregulated drawn out, the magnet members attract these successive loops and properly stop them at a prescribed position until a pulled-up order comes. Therefore, the upper end of the loop lamination body can be drawn out from the upper end of loop lamination body one by one in a right order.

This invention is so constituted that the diameter of wire withdrawal hole of the presser member is made to be equal or larger than the inner diameter of loop lamination body, i.e., the inner brim of wire withdrawal hole is retracted in more

peripheral direction than the inner brim of wire withdrawal hole to expose the inner side of the upside of loop lamination body, therefore the rotary moments A, B acting on the drawn-out wire shown in Fig. 6 relatively reduce. Therefore the drawing wire does not tangle into the wire on the upside of lamination body. The rising angle of drawing wire becomes gentle as a whole, the drawing resistance of wire reduces and the bending degree of wire at the inner brim of wire withdrawing hole also decreases, therefore no abrasion or bending is given to the wire, thus the stability of wire withdrawal is improved. When such a presser member is constructed so as to get into touch with only a part of the upside of wire lamination body, no any applied force due to the presser member acts on the other part, therefore it is usually dragged by the drawn wire, successive several loops are simultaneously drawn out and a trouble easily occurs, but in this invention, the magnet members are provided in the presser member, therefore the occurrence of such a trouble is prevented by the wire loop attraction effect of the magnet members as described above.

When a control member protruding above the cavity part of the loop lamination body in the form of eaves is provided, it assumably controls a disordered motion of wire in the cavity part by the shielding action of control member even when it /4

is dragged by a drawn wire and successive several loops are drawn together and enables a normal withdrawal of wire.

The attractive force of the magnet members has the above function as well as a function of preventing the jump-up of the wire loops. Namely, this invention prevents the jump-up of wire at the upper end of loop lamination body by a pressing force due to the self-weight of the entire presser member and the attractive force of the magnet member, therefore the suppressing effect is much better than conventional one due to the self-weight of presser member. Accordingly, this invention enables to reduce the self-weight of presser member.

[Examples]

The present invention is described below based on examples shown in drawings. Of course, the following examples do not restrict the present invention, and various modes are considered within a scope where the substance of present invention is not deviated.

Fig. 1 is a general oblique view (partially broken) showing a user mode of a pail pack for housing welding wire of the first invention, and Fig. 2 is its vertical sectional view. A pail pack **11** is provided with a cylinder **12** and a bottom **13**. A steel welding wire twisted inside it is laminated and housed in the form of loops. **14** represents this laminated and housed loop lamination body, and a presser member **15** of the wire loops is

mounted at the upper end of the loop lamination body **14**. The presser member **15** of this example is constructed from an annular plate-shaped presser member main body **15a** made of a synthetic resin for suppressing wire loops at the upper end of loop lamination body **14** by its self-weight and magnet members **15b** consisting of plural (6 in this example) permanent magnets arranged on the upside of main body **15a** at every constant interval. The magnet members **15b** are installed by fitting them in recesses provided in the presser member (like this example) or in through-holes provided in the presser member with an adhesive or by bolts-nuts or other proper means. They are so constructed that the diameter L of a wire withdrawing hole **16** provided in the presser member main body **15a** is equal to or larger than the inner diameter l of loop lamination body **14** ($L \geq l$), therefore a pulled-up wire W is not disturbed by the inner brim of the wire withdrawing hole as described above.

The fly-off of wire from a gap **19** between the periphery of presser member **15** and the inner wall of pail pack cylinder **12** is eliminated by a method of Japan Utility Model 64-4764, **17** is a button used by said method, and **18** is a hole through which the button **17** is inserted. Of course, the fly-off prevention of wire from the gap **19** is not restricted to the method, other proper well-known means can also be used.

When the welding wire W is withdrawn from the pail pack thus constructed, the action as described in said paragraph of (functions) is presented to realize a smooth wire withdrawal.

In a pail pack for continuous withdrawal during exchange of pail packs, the wire end E is arranged along the pail pack cylinder **12** and mounted below the presser member **15** or above the cylinder **12** via the inner brim of wire withdrawing hole **16** with a tape, etc. Then, the wire is used and, at a proper time the loop lamination body **14** runs short, connected to the start end of wire in the next adjacently arranged pail pack. In this case, the presser member presents a lifted state by the wire at the lower end in the past and consequently the suppressing effect reduces, the trouble caused by simultaneous withdrawal of 2 ~ 3 loops to the cavity part in the pail pack markedly occurs, but this invention is provided with the magnet members in the presser members, therefore such a trouble does not occur due to the wire loop attraction effect of magnet members.

Fig. 3(a) is a vertical sectional view showing a user mode of a pail pack for housing welding wire of the second invention, and Fig. 3(b) is a general oblique view of presser member. The example is different from the example of Fig. 1 in that the presser member is provided with a control member protruding above the cavity part of the loop lamination body in the form of eaves rising at a prescribed angle, in this example, a truncated

cone-shaped control member **20** made of a synthetic resin. If such a control member **20** is provided, the control member **20** has a wire withdrawing hole **21** narrower than the wire withdrawing hole **16** above the wire withdrawing hole **16** of the presser member main body **15a**, therefore a disordered motion of wire can be controlled by a shielding effect of the control member even if the wire is dragged by the lifted-up wire W and successive 2 ~ 3 loops of wire are drawn out together to the cavity part **22** in the pail pack, thus a normal wire withdrawal becomes possible. Of course, the diameter L of wire withdrawing hole **16** is /5 also equal to or larger than the inner diameter l of loop lamination body **14** ($L \geq l$) in this case. In this example, the magnet members **15b** are mounted by fitting them to the through-holes provided in the presser member **15a**.

Various modes in addition to the examples shown above are considered in the present invention. The position and shape of mounting the magnet members to the presser member main body **15a** are also not specially restricted in the present invention. Fig. 4(a) ~ (g) are partial sectional views (the control member is not illustrated) showing other examples for mounting the magnet members to the presser member main body. In a presser member **51** of Fig. 4(a), the lower part is taken as the presser member main body $\mathbf{15a_1}$ and the upper part is taken as the magnet member $\mathbf{15b_2}$; in a presser member **52** of Fig. 4(b), the outer periphery side is

taken as the presser member main body **15a$_2$** and the inner periphery side is taken as the magnet member **15b$_2$**; in a presser member **53** of Fig. 4(c), the outer periphery side is taken as the presser member main body **15a$_3$** and the inner periphery side is taken as the magnet member **15b$_3$**; in a presser member **54** of Fig. 4(d), a tape-like presser member main body **15b$_4$** is annularly pasted to the inner periphery side on the downside of presser member main body **15a$_4$**; in a presser member **55** of Fig. 4(e), tape-like magnet members **15b$_5$** are radially pasted to the downside of a presser member main body **15a$_5$** at an interval; in a presser member **56** of Fig. 4(f), ring-like magnet members **15b$_6$** are mounted to the upside of a presser member main body **15a$_6$**; in a presser member **57** of Fig. 4(g), a presser member main body **15ab** is taken as the magnet itself. As is evident in these examples, the presser member main body and the magnet members may be integrated or separate. The shape of control member may be raised at a prescribed angle from the presser member or may be gently raised with a prescribed curvature, the shape of control member, the way, position, material, etc. of mounting the control member to the main body are also not specially restricted. Fig. 5(a), (b) are general oblique views showing other examples of control members. A control member **201** of a presser member **58** of Fig. 5(a) is an example in which the truncated cone-shaped control member **20** shown in Fig. 3(b) is notched in waves, and a control

member **202** of a presser member **59** of Fig. 5(b) is an example in which the wavy notches shown in Fig. 5(a) are not only a control member but also reach the main body **15a** part. Various other synthetic materials such as vinyl chloride, etc. can also be used as materials of the presser member main body. In short, the presser member of pail pack of the present invention is provided with a wire withdrawing hole having a diameter equal to or larger than the inner diameter of a loop lamination body, mounted at the upper end of loop lamination body, wire loops at the upper end of loop lamination body are pressed by their self-weight to prevent the jump-up of wire loops while lowering with the upper end of loop lamination body associated by the consumption of wires due to the withdrawal of wires, and ferromagnetic wire loops are attracted by magnet members to prevent successive wire loops from being dragged by the wire being pulled up and irregularly drawn out, when a control member is provided, a dis-ordered motion of the wire is controlled by a shielding action of the control member even the wire is assumably drawn out, if such functions and effects are taken, various examples are con-sidered without specially restricting the material, shape, struc-ture, etc.

[Effects of the invention]

As described above, this invention enables to draw out a wire regularly and stably from wire loops at the upper end of a

loop lamination body of welding wire housed in a pail pack and withdraw the wire from the pail pack extremely smoothly without such inconvenience as tangling, twining, etc. due to drawing out 2 ~ 3 loops together as before. This invention enables to display its effects on withdrawing a welding wire which is laminated and housed in a pail pack of single cylinder shape (a pail pack having a gap between the outer wall of an inner cylinder and the inner periphery of a loop lamination body in case an inner cylinder exists) by giving a twist and performing the wire withdrawal smoothly and continuously without interrupting weld-ing operation, thus it has extremely high practical applicabi-lity in spite of its simply constitution.

IV. Brief Description of the Drawings

Fig. 1 is a general oblique view (partially broken) showing a user mode of a pail pack for housing welding wire of the first invention,

Fig. 2 is a vertical sectional view of Fig. 1,

Fig. 3(a) is a vertical sectional view showing a user mode of the second invention,

Fig. 3(b) is a general oblique view of a presser member of Fig. 3(a),

Fig. 4(a) ~ (g) are partially sectional views showing other examples of mounting magnet members to a presser member main body, /6

Fig. 5(a)(b) are general oblique views showing other examples of control member, and

Fig. 6, Fig. 7(a), (b), (c) are views describing a prior art.

11) pail

12) cylinder

14) loop lamination body

15) presser member

15a) presser member main body

15b) magnet member

16) wire withdrawing hole

20) cavity part

W) pulled-up wire

E) wire end

Fig. 1

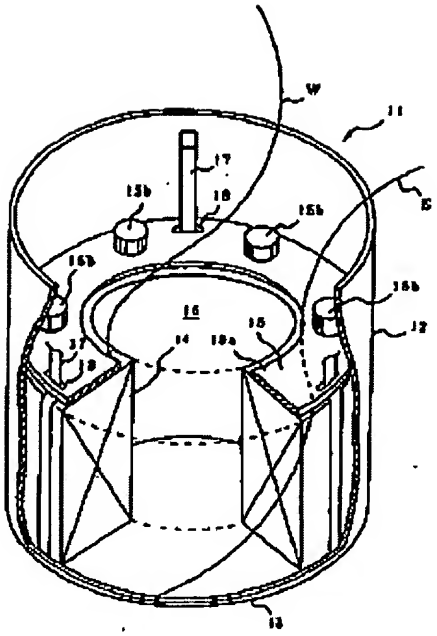


Fig. 2

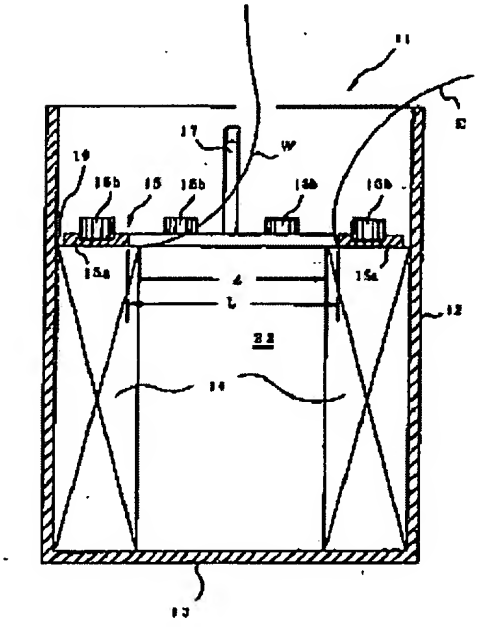


Fig. 3

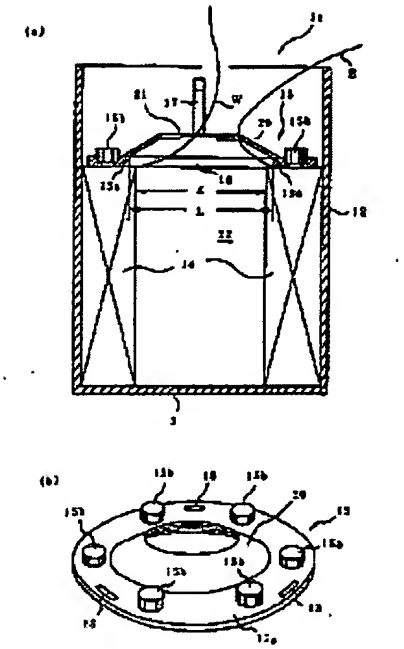
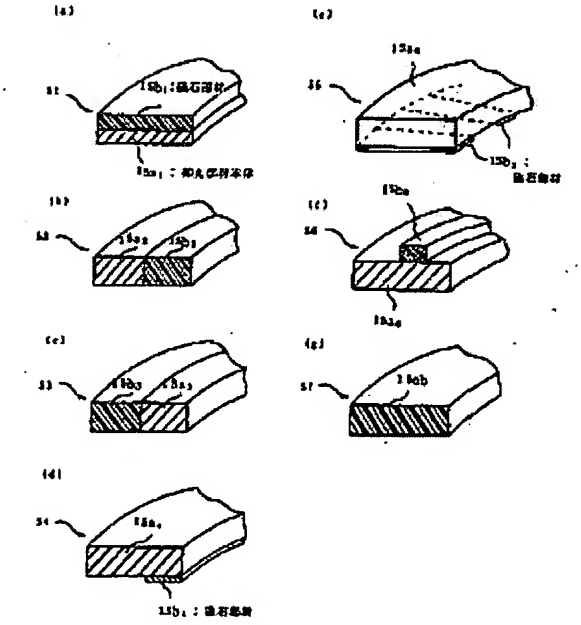


Fig. 4



$15a_1$) presser member main body

$15b_1$) magnet member

$15b_4$) magnet member

$15b_5$) magnet member

Fig. 5

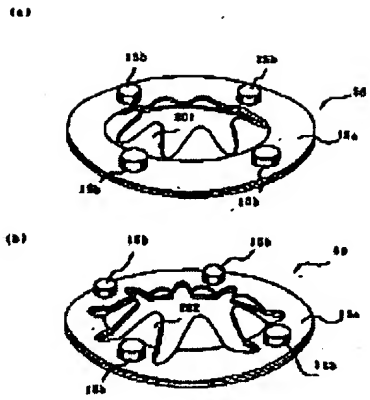


Fig. 6

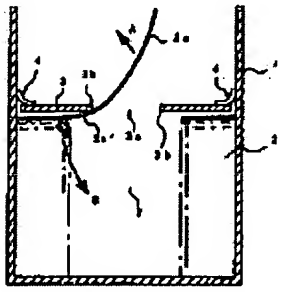


Fig. 7